

# Active Work Zone Management (AWZM)



*Sustainable Transportation Solutions, using Technology and Communications.*

# Active Work Zone Management = Intelligent Work Zone 2.0



*Where the focus changes from equipment, to proactive management with facts, data, and the tools necessary to influence behavior.*

# Active Work Zone Management

3 functional areas:

1. Active Traffic Management Tools
2. Performance Monitoring
3. Communications - Internal / External

*Design - Implement - Monitor - Modify - Repeat*

# Active Work Zone Management

## 1. Active Traffic Management Tools

- Vehicle responsive
- Traffic responsive
- Environmental responsive

A. Individual control

B. Networked intelligent control

## 2. Manual web control or automated

# Active Work Zone Management

## 2. Performance Monitoring

- Work zone exposure
- Traffic queuing
- Traveler delay
- Travel time reliability
- Safety
- Weather

# Active Work Zone Management

## 3. Communications

### A. Internal

- Custom project reports
- Equipment operational reports

### B. External

- Stakeholders
- Traveling public
- Impacted business

# AWZM

Project based tools and service to fulfill the expectations of the “Final Rule for Safety and Mobility”

# Final Rule - Safety/Mobility

*The State and the contractor shall each designate a trained person, as specified in § 630.1008(d), at the project level who has the primary responsibility and sufficient authority for implementing the TMP and other safety and mobility aspects of the project.*

*The changes to the regulation will facilitate comprehensive consideration of the broader safety and mobility impacts of work zones across project development stages, and the adoption of additional strategies that help manage these impacts during project implementation.*

# Final Rule - Safety/Mobility

3 functional areas:

- A. Temporary Traffic Control plan (TTC)
- B. Transportation Operations (TO)
- C. Public Information (PI)

*Design - Implement - Monitor - Modify - Repeat*

# TMP and Performance Benefits

- A. **Temporary Traffic Control Plan** (TTC) is used for facilitating road users through a work zone or an incident area.

## *Benefits:*

*Work zone performance measures allow agencies to quantify how work zones are impacting motorists, and how actions being taken (management strategies, technologies deployed) to mitigate those impacts are or are not working.*

# TMP and Performance Benefits

- B. **Transportation Operations** (TO) mitigates impacts of the work zone on the operation and management of the transportation system within the work zone impact area.

## *Benefits:*

*Work zone performance measures assist agencies in making investment decisions, developing and improving policies, and defining program priorities.*

*Information about the effectiveness or ineffectiveness of strategies and technologies is valuable to state DOTs when determining whether or not to include them on upcoming projects.*

*Performance measures can also aid agencies in refining work zone policies and procedures (e.g., Is setting a specific maximum allowable delay per vehicle a useful policy objective? Do the traffic impact analysis tools being used accurately reflect what actually occurs in the field?). Finally, performance measures emphasize accountability by the agency, since what gets measured typically gets done (or is at least considered).*

# TMP and Performance Benefits

- C. **Public Information** (PI) shall include communications strategies that seek to inform affected road users, the general public, area residences and businesses, and appropriate public entities about the project, the expected work zone impacts, and the changing conditions on the project.

## *Benefits:*

*Work zone performance measures assist agencies in communicating with elected officials and with the public. State DOTs can use work zone performance measures to “tell their story” and ensure that everyone has the correct information about how safety and mobility is being affected by roadway construction and maintenance efforts under their jurisdiction. The story includes both what is being done and how well what is being done is working. This type of agency transparency facilitates public understanding and can improve acceptance of the impacts that do occur and builds trust that any subsequent funding will be spent wisely.*

# Additional Notes

## *TMP NOTE:*

*Implement the TMP in sustained consultation with stakeholders (e.g., other transportation agencies, railroad agencies/operators, transit providers, freight movers, utility suppliers, police, fire, emergency medical services, schools, business communities, and regional transportation management centers).*

## *Benefits:*

*Work zone performance measures can be of interest or value to a wide range of audiences. More importantly, these different audiences may need somewhat different performance measures. For instance, measures useful to DOTs for work zone mobility impacts (e.g., percent of work zones meeting the agency queue threshold) may be different than those used to describe impacts to the public, local residents, or nearby businesses (e.g., average work zone delay).*

# I-94 Construction Work Zone Travel Information Survey

October 2013

# How could MnDOT improve travel information signs or make information more useful?

- 100 people provided responses to the open-ended question that asked ***“How would you improve any of the travel information signs or make the information more useful?”***
- **The six main recommendations from the comments were:**
  - Post signs earlier or when people can see before getting off highway
  - Improve the accuracy and consistency of signs
  - Post more information on the signs (e.g., name of towns, exit #, length (miles) of construction work, length in time of project, website, estimated time to take alternative route, state if you can re-access the highway from the alternative route)
  - Post signs to stop early merging
  - Post alternative routes with maps on MnDOT’s website
  - Create a system that sends alerts via email or text
- 15% of the responses were very positive. People indicated being happy with the signs and MnDOT’s work

# Information that would have made the construction zone easier for respondents to drive through (Cont.)

**Other suggestions provided by a few respondents included:**

- Provide more project status updates and project details (8%)
- Post travel times (8%)
- More frequent email, text updates or phone messages with updates (6%)

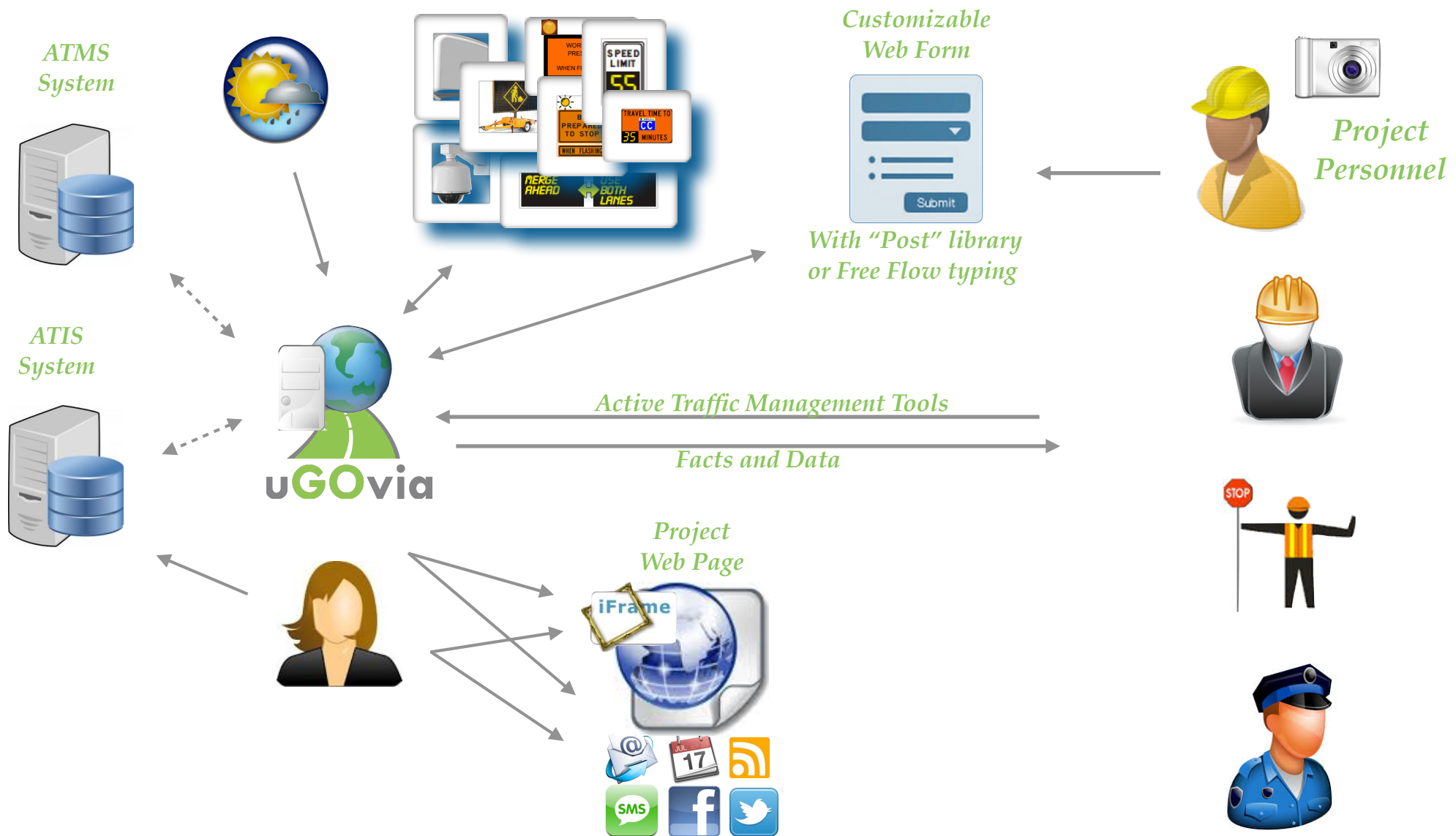
**Comments:**

- *“Running estimate on project progress. For example, the project is now approximately 33% complete and is on schedule for a July 15 completion date.”*
- *“More up to date info via phone messages. From the time I check the computer until I get to the construction zone, traffic can change considerably.”*

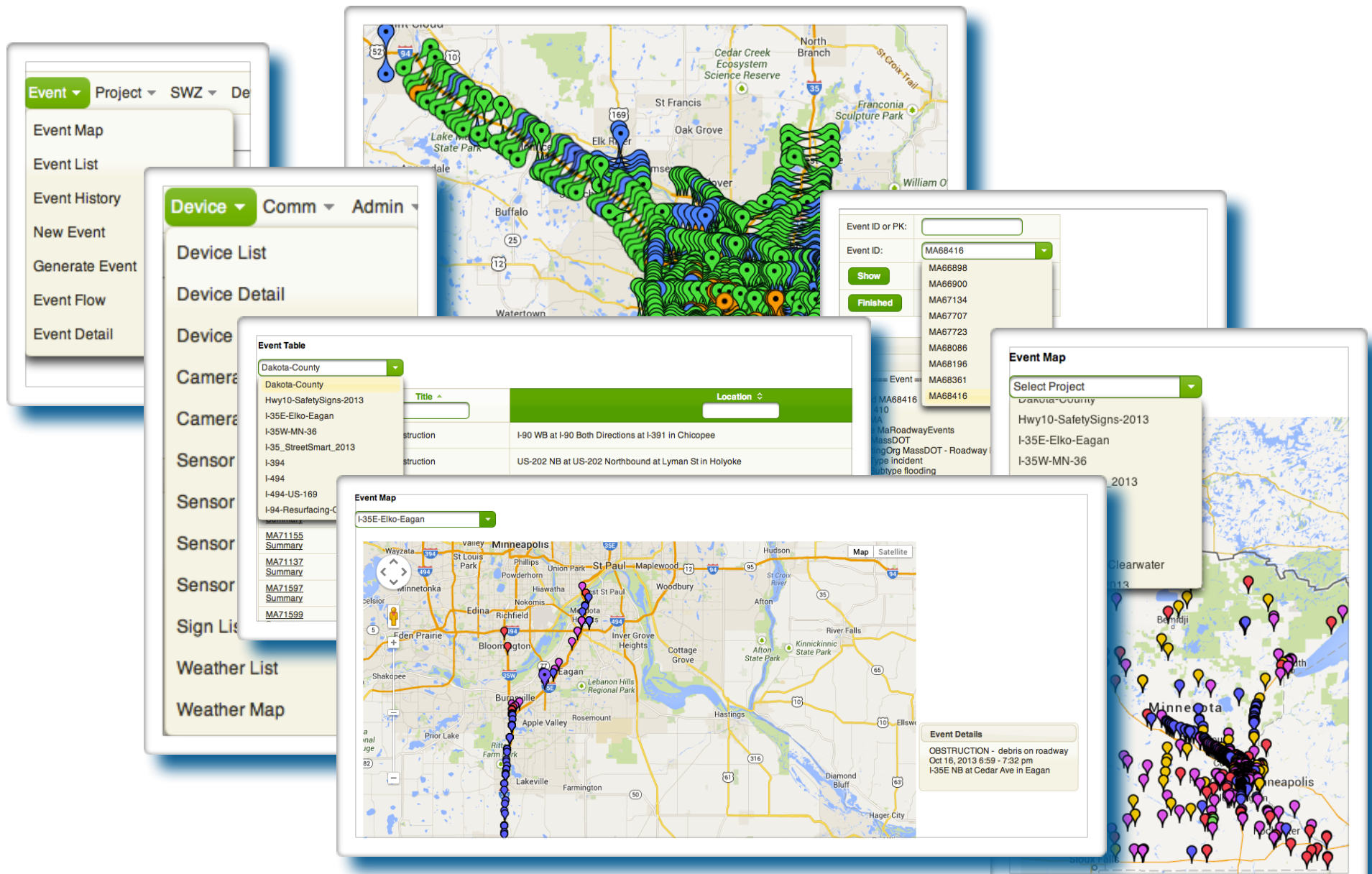
# Conclusions & Recommendations: Signage and Website

- As feasible, post signs farther back on the roadway, where drivers can see them before exiting onto the route under construction or hitting likely back-ups; allow for more decision time.
- To the extent possible, post information about upcoming delays at least a month in advance of construction starts to allow for more planning time.
- Consider including more information on the posted signs (names of towns, exit numbers, miles of construction work, etc.).
- Post suggested alternative routes with maps on MnDOT's website, 511mn app.
- Provide project status updates and additional project details on 511 and project websites. While a minority of respondents suggested this in their comments, this request is consistent with feedback from other surveys.

# How?



# Aggregate data



# Online - Project “POST” library

## Step 1

Select Primary Project and additional Projects (optional)

Primary Project:

### Projects Available

CottageGrove-PM2013-Zone2

CottageGrove-PM2013-Zone3

## Step 2

Select Event Type from the menu and enter Title and Description

Event Type:

Title:

Description:

Select One

Milling

Removing

Spot Removal

Patching

Paving

### Upload New Photo

Caption:

File:

no file selected

Event ▾ Project ▾ SWZ ▾ De

Event Map

Event List

Event History

New Event

Generate Event

Event Flow

Event Detail

# Collect where and when

## Step 3

Enter start and end times

Start time

End time

March 2014

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

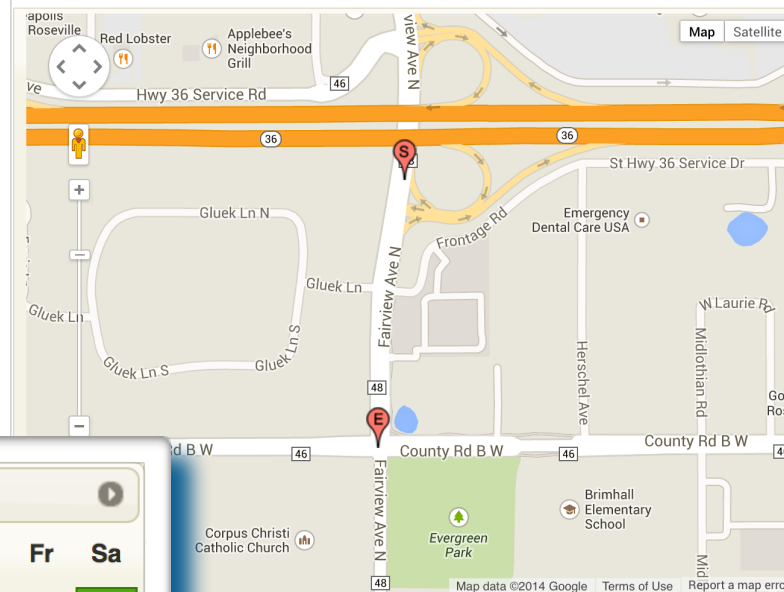
Time 00:00

Hour

Minute

## Step 4

Click twice to select start and end event location



Country:	US
State:	MN
Start Place:	<input type="text" value="Roseville"/>
Start Roadway:	<input type="text" value="Fairview Ave N"/>
Start Cross Street:	<input type="text" value="Hwy 36 W"/>
<input type="button" value="Swap Start Roadway and Cross Street"/>	
End Place:	<input type="text" value="Roseville"/>
End Roadway:	<input type="text" value="Fairview Ave N"/>
End Cross Street:	<input type="text" value="Co Rd B W"/>
<input type="button" value="Clear Locations"/>	

## Step 5

Click Save Event to complete event entry

# Or with email and photos

Begin project Paving


To: [ugovia.reports@ugovia.com](mailto:ugovia.reports@ugovia.com)

Cc:

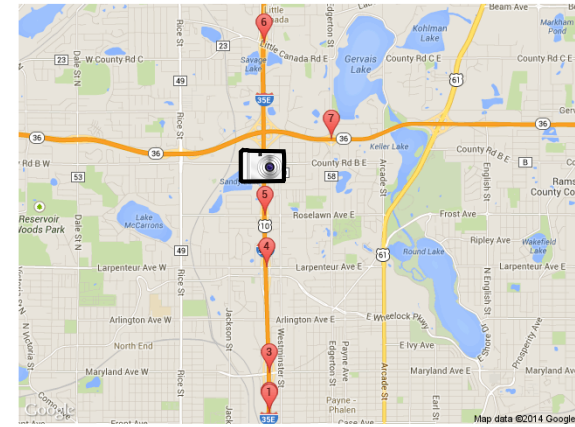
Subject: Begin project Paving

From: "Eric A. Johnson" <[eric.johnson@ugovia.com](mailto:eric.johnson@ugovia.com)> Signature: None

Passcode: 101010



## Traffic Impacts in the past week

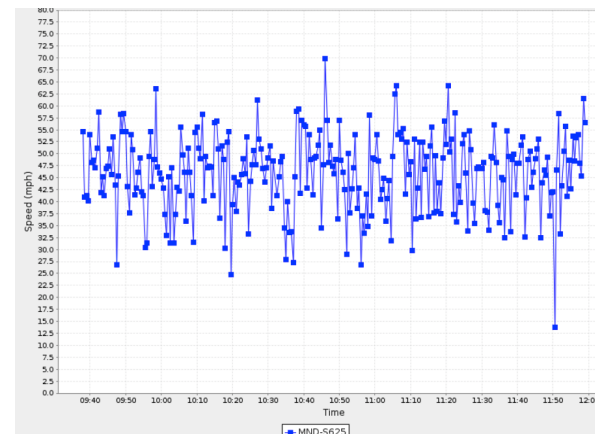
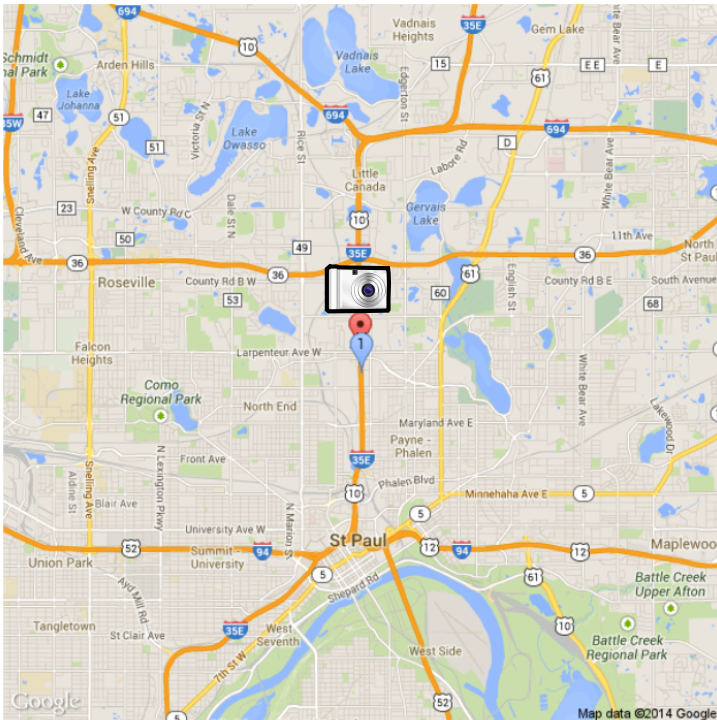


Title	Time	Location
1 <a href="#">debris on roadway</a>	Tue Mar 18, 2014 08:41 AM(5 min)	I-35E SB at E Lawson Ave in St. Paul
2 <a href="#">Delay on 35E-WLMN-1-NB</a>	Mon Mar 17, 2014 10:33 PM(4 min)	I-35E NB from Jenks Ave to Little Canada Rd
3 <a href="#">vehicle spun out</a>	Mon Mar 17, 2014 10:42 AM(60 min)	I-35E NB at Maryland Ave E in St. Paul
4 <a href="#">vehicle spun out</a>	Mon Mar 17, 2014 10:37 AM(21 min)	I-35E NB at Larpenteur Ave E in Maplewood
5 <a href="#">vehicle spun out</a>	Mon Mar 17, 2014 09:27 AM(50 min)	I-35E NB at E Roselawn Ave in Maplewood
6 <a href="#">Begin Paving</a>	Sat Mar 15, 2014 11:17 PM(187 min)	I-35E SB at Little Canada Rd E in Little Canada
7 <a href="#">crash</a>	Sat Mar 15, 2014 05:03 PM(63 min)	MN 36 at Edgerton St in Maplewood
8 <a href="#">crash</a>	Fri Mar 14, 2014 04:21 PM(44 min)	I-35E SB at MN 36 E in Little Canada
9 <a href="#">debris on roadway</a>	Fri Mar 14, 2014 03:26 PM(24 min)	MN 36 at Edgerton St in Maplewood
10 <a href="#">stalled vehicle</a>	Fri Mar 14, 2014 02:51 PM(11 min)	I-35E SB at N Mississippi St in St. Paul
11 <a href="#">stalled vehicle</a>	Thu Mar 13, 2014 05:59 PM(13 min)	I-35E SB at Maryland Ave E in St. Paul
12 <a href="#">stalled vehicle</a>	Thu Mar 13, 2014 03:33 PM(21 min)	I-35E NB at Maryland Ave E in St. Paul
13 <a href="#">crash</a>	Thu Mar 13, 2014 12:56 PM(32 min)	I-35E SB at Larpenteur Ave E in Maplewood

# Project Photos

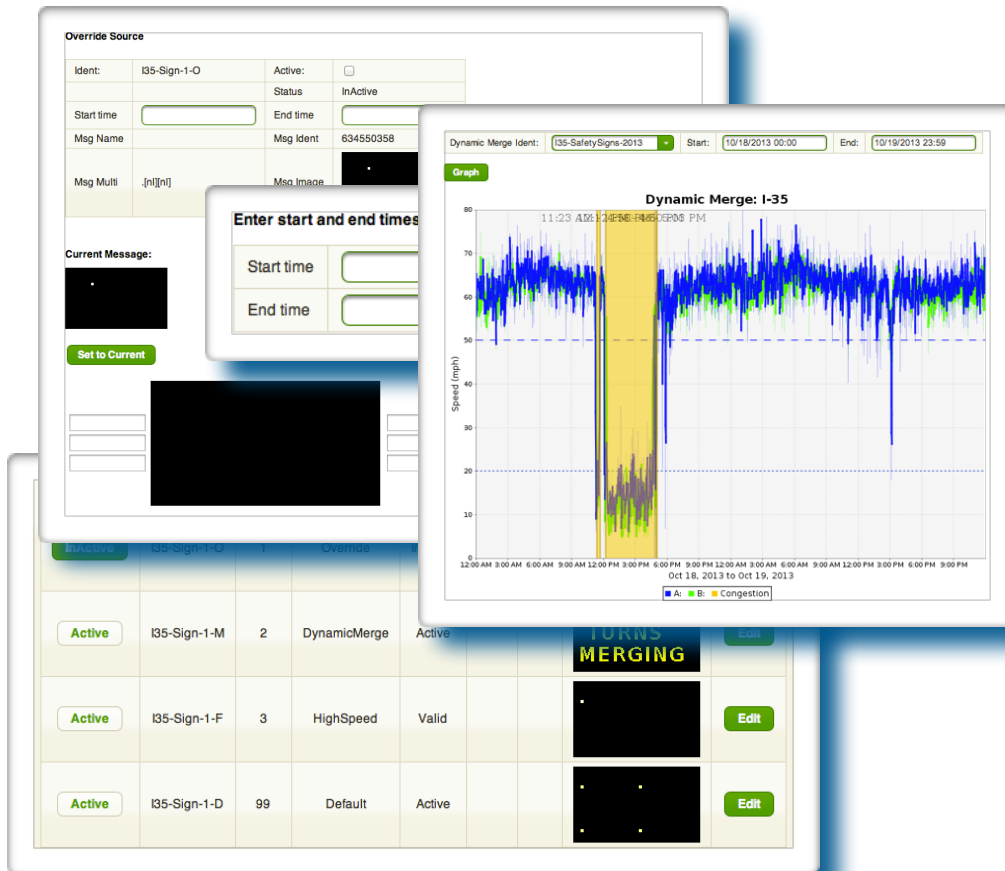
## Event Report

Event Id	MNMSCAD-P140127571	Status	Cleared	State	MN
Type	Paving	Sub Type		Title	Begin
Description					
Start	2014-03-17 10:37:53.0	Start Location	I-35E NB at Larpenteur Ave E in Maplewood	Start GPS	44.991853 -93.0891
End	2014-03-17 10:59:13.0	End Location		End GPS	

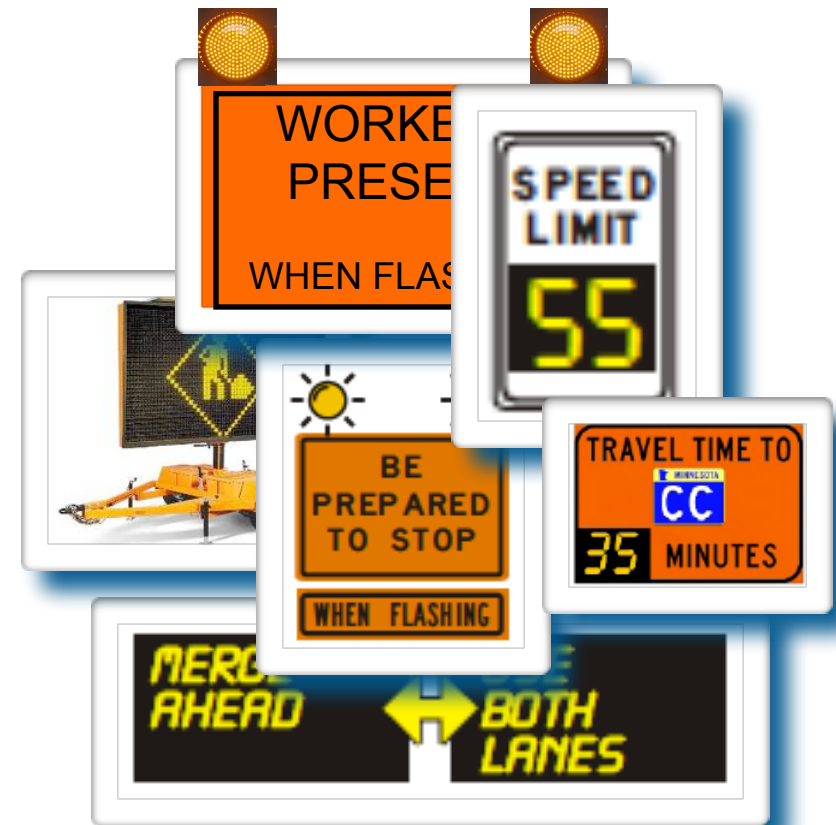


# Automated/Manual

## Sign/ Sensor/ Camera Management



## Sign Control



# Publish

- Relevant 511 Info
- Real-Time corridor traffic
- Travel Time
- Project progress
- Alternate route options
- Schedule of events
- Area weather data
- Public service announcements



Automated

Channels for:

Location

Impact Type

Stakeholder

Enforcement

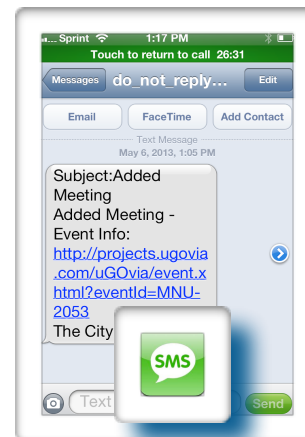
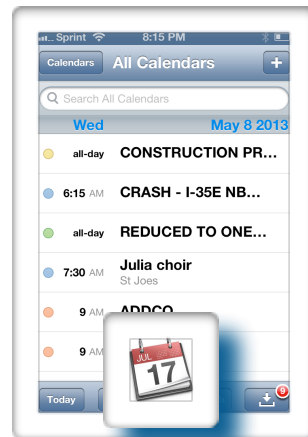
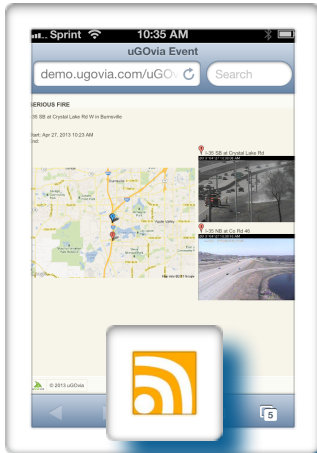
TBD



## Sign Automation



# Multi-Channel Automation



From: do\_not\_reply@ugovia.com  
Subject: Added Meeting - Project Notice- July 24th, 2013 - Today 2:30 PM - Project Notice- July 24th, 2013  
Date: July 24, 2013 2:30 PM  
To: Eric Anderson <erica@ugovia.com>

NEW DOCUMENT: PROJECT NOTICE- JULY 24TH, 2013  
Today 2:30 PM  
Download: [H Indian spot repair curb Notice.pdf](#)

For more info goto <http://projects.ugovia.com/uGOvia/event.xhtml?eventid=MNU-44>

Event Id: MNU-44

## ROAD CONSTRUCTION

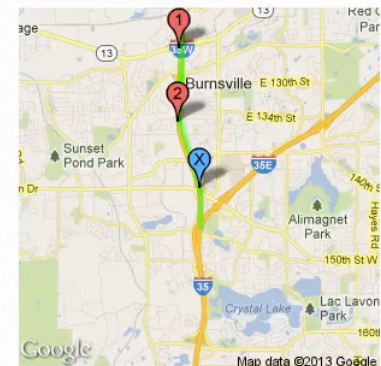


I-35W NB mile .7  
May 28 8:00 PM to May 29 5:01 AM



I-35W SB at Burnsville  
Pkwy  
2013-05-29 04:05:54 PM

## Auto-camera/sensor aggregation



I-35W is reduced to a single lane in both directions between the Burnsville I-35W/I-35E split and County Road 42.



© 2013 uGovia

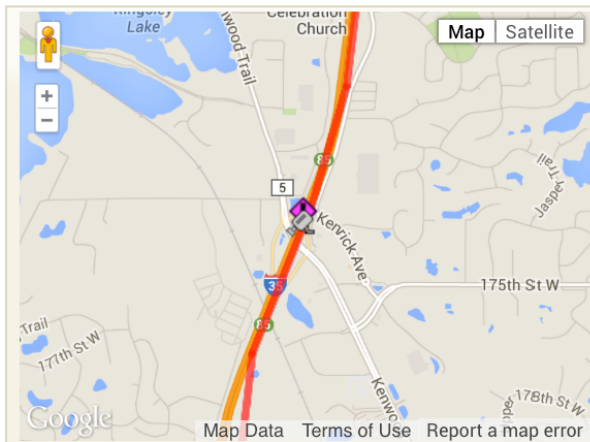
# Pan and Click Map

## MULTI VEHICLE CRASH

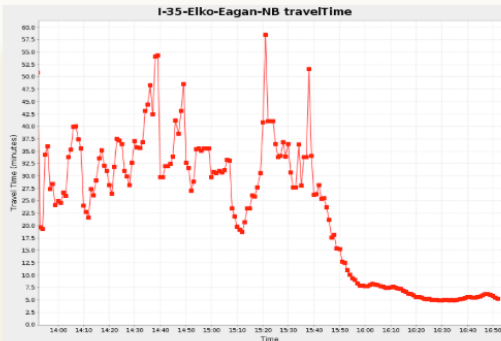
I-35 NB at Kenwood Trl in Lakeville  
Feb 28, 2014 2:52 - 3:53 pm

Description:

I-35E-Elko-Eagan



INCIDENT - multi vehicle  
Feb 28, 2014 2:52 - 3:53 pm  
I-35 NB at Kenwood Trl in L

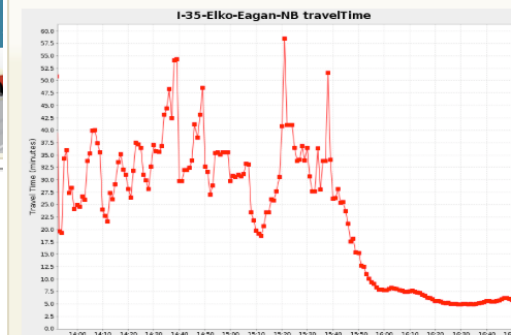
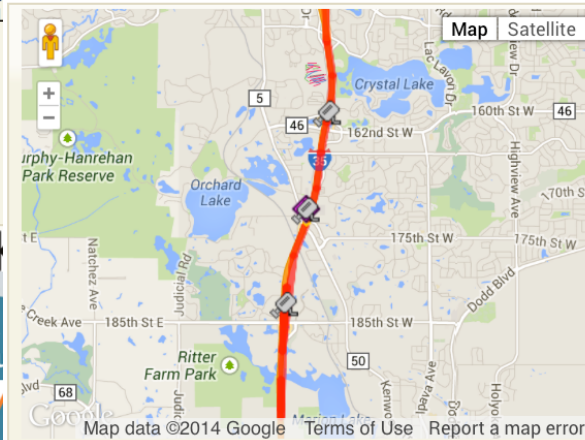


## MULTI VEHICLE CRASH

I-35 NB at Kenwood Trl in Lakeville  
Feb 28, 2014 2:52 - 3:53 pm

Description:

I-35E-Elko-Eagan



Camera Camera I-35 NB at Co Rd 50

2014-03-19 08:20:16 PM



# Project Web Page iFrame

## *Current and Planned Events*

Title	Time	Location
<u>reduced to one lane</u>	Mar 17 7:00 PM to Mar 18 5:00 AM	I-35E NB from MN 36 (mile 111.7) to mile 109.5 in Little Canada
<u>vehicle spun out</u>	Mar 17, 2014 10:42 - 11:43 am	I-35E NB at Maryland Ave E in St. Paul

vehicle spun out

vehicle spun out

right lane closed

Delay on 35E-WLM

Crash

## *Current and Planned Events*

Title	Time	Location
<u>crash</u>	Mar 17, 2014 5:37 - 5:52 pm	I-35E SB mile 103.4
<u>crash</u>	Mar 17, 2014 4:52 - 5:01 pm	I-35E SB at Hwy 110 in Mendota Heights
<u>crash</u>	Mar 17, 2014 1:01 - 1:48 pm	I-35 NB mile 76.0
<u>crash</u>	Mar 17, 2014 10:52 - 11:19 am	I-35 SB at 210th St W in Lakeville
<u>crash</u>	Mar 17, 2014 10:50 - 11:36 am	I-35 SB mile 79.0
<u>vehicle spun out</u>	Mar 17, 2014 10:40 - 11:03 am	I-35E NB at Diffley Rd in Eagan
<u>vehicle spun out</u>	Mar 17, 2014 10:39 - 10:43 am	I-35 NB mile 76.0
<u>crash</u>	Mar 17, 2014 10:04 - 10:28 am	I-494 WB mile 71.8
<u>crash</u>	Mar 17, 2014 9:39 - 9:53 am	I-35E NB at Yankee Doodle Rd in Eagan
<u>crash</u>	Mar 17, 2014 9:31 - 9:57 am	I-35E NB at Diffley Rd in Eagan
<u>vehicle spun out</u>	Mar 17, 2014 9:30 - 10:04 am	I-35 NB at 225th St E
<u>crash</u>	Mar 17, 2014 9:29 - 10:16 am	I-35E NB at Lone Oak Rd in Eagan
<u>crash</u>	Mar 17, 2014 9:27 - 10:31 am	I-35 NB at Co Hwy 2
<u>crash</u>	Mar 17, 2014 9:21 - 9:30 am	I-35 NB at 210th St W in Lakeville
<u>vehicle spun out</u>	Mar 17, 2014 9:05 - 10:04 am	I-35 SB at Co Hwy 2
<u>crash</u>	Mar 17, 2014 8:48 - 9:57 am	I-35 SB at 225th St E
<u>New Document: Project Summary</u>	Jun 5, 2013	

# Custom Reports

uGOvia

To: Eric A. Johnson <eric.johnson@ugovia.com>

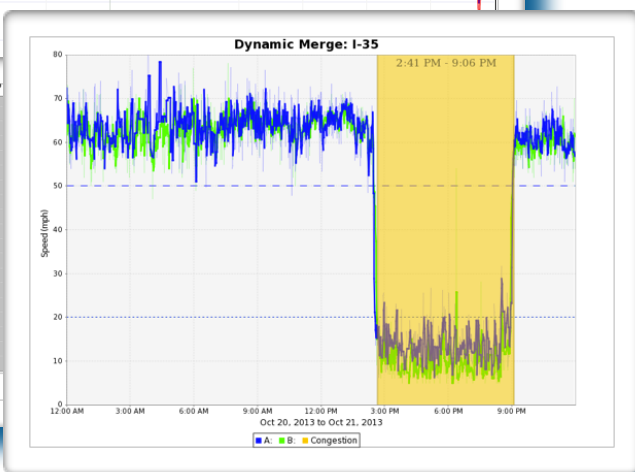
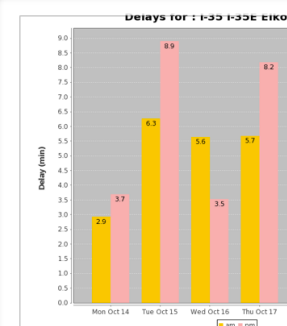
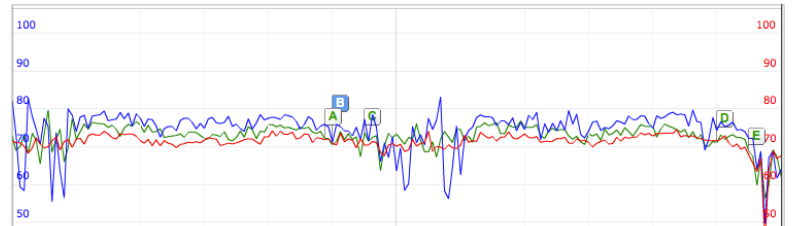
uGOvia Report: I-35E WLMN Project

## Project Report: 35E-WLMN-1

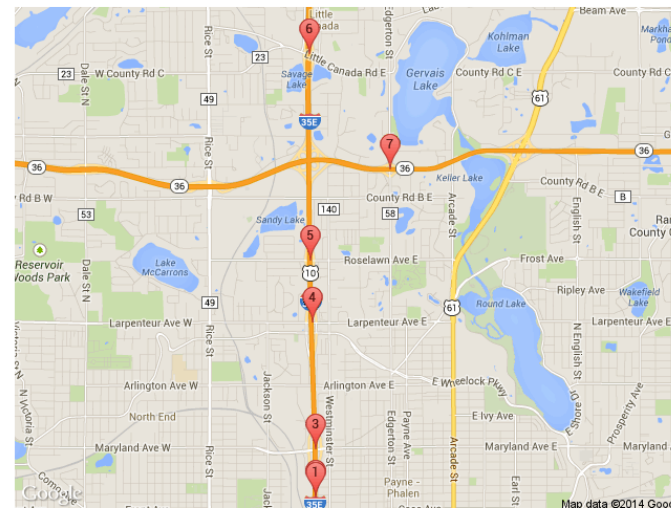
generated: Wed Mar 19, 2014 01:00 AM

### Construction Schedule for next 7 days:

Title	Time	Location
1 <a href="#">reduced to one lane</a>	Tue Mar 18, 2014 07:00 PM	I-35E NB at MN 36 in Little Canada



### Traffic Impacts in the past week

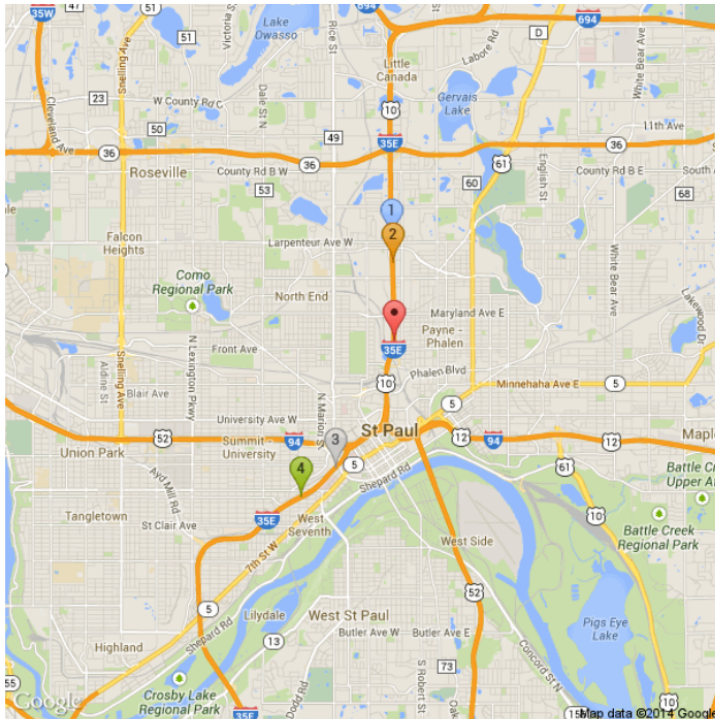


Title	Time	Location
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4 <a href="#">vehicle spun out</a>	Mon Mar 17, 2014 10:37 AM(21 min)	I-35E NB at Larpeteur Ave E in Maplewood
5 <a href="#">vehicle spun out</a>	Mon Mar 17, 2014 09:27 AM(50 min)	I-35E NB at E Roselawn Ave in Maplewood
6 <a href="#">incident</a>	Sat Mar 15, 2014 11:17 PM(187 min)	I-35E SB at Little Canada Rd E in Little Canada
7 <a href="#">crash</a>	Sat Mar 15, 2014 05:03 PM(63 min)	MN 36 at Edgerton St in Maplewood
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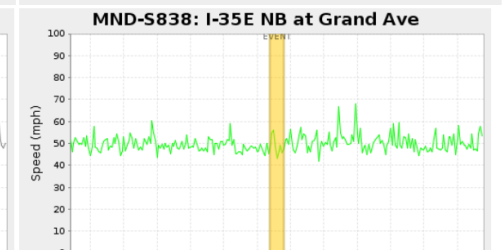
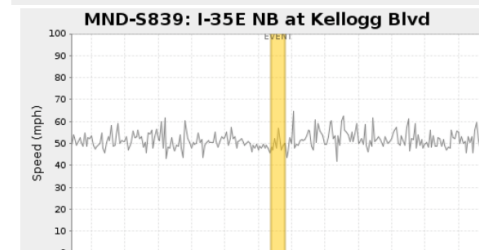
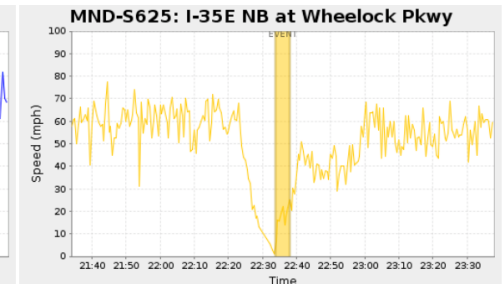
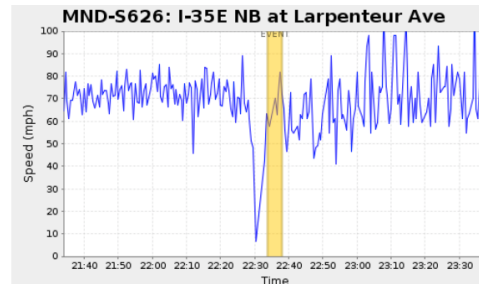
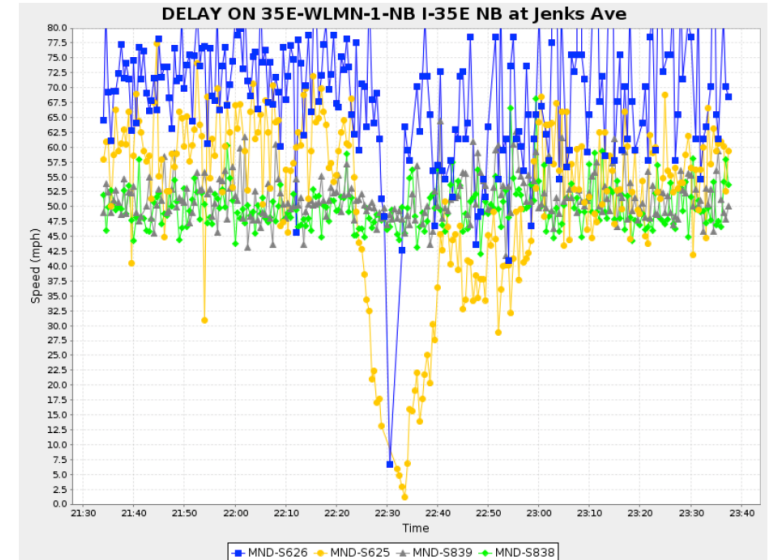
# Assemble the Facts

## Event Report

Event Id	MNU-157	Status	Cleared	State	MN
Type	delay	Sub Type		Title	Delay on 35E-WLMN-1-NB
Description					
Start	2014-03-17 22:33:55.0	Start Location	I-35E NB at Jenks Ave	Start GPS	44.97185 -93.08854
End	2014-03-17 22:37:55.0	End Location	I-35E NB at Little Canada Rd	End GPS	45.02306 -93.08956

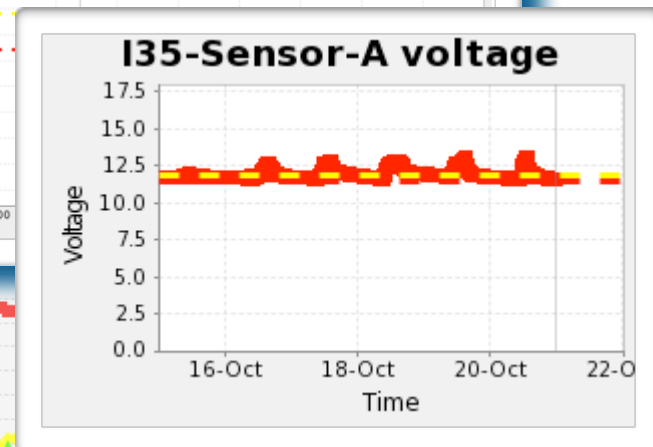
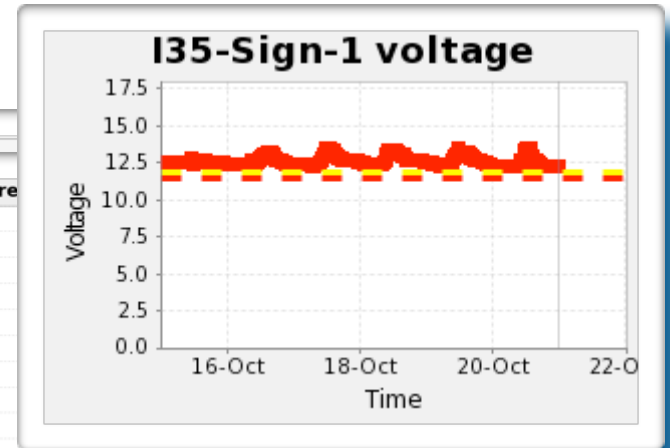
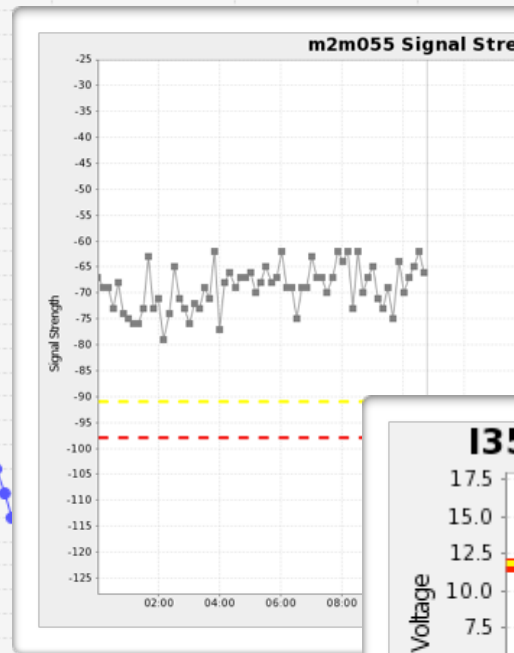
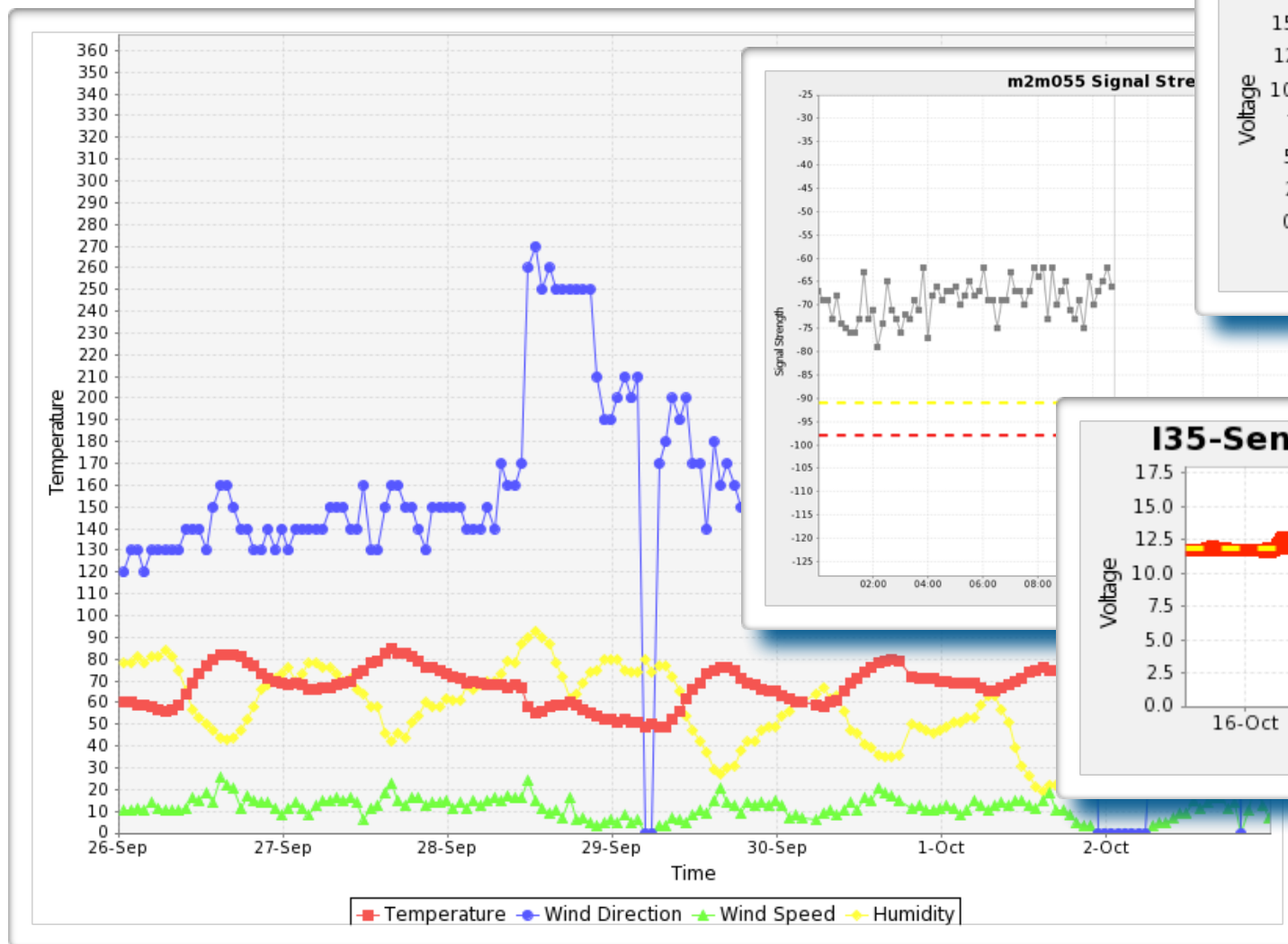


1. Sensor MND-S626 at I-35E NB at Larpenteur Ave
2. Sensor MND-S625 at I-35E NB at Wheelock Pkwy
3. Sensor MND-S839 at I-35E NB at Kellogg Blvd
4. Sensor MND-S838 at I-35E NB at Grand Ave



# Status Report

## Project Weather Recording



# AWZM Goals

Improve network utilization

Reduce accidents

Improve worker safety

Promote speed harmonization

Improve traveler safety

Reduce project costs

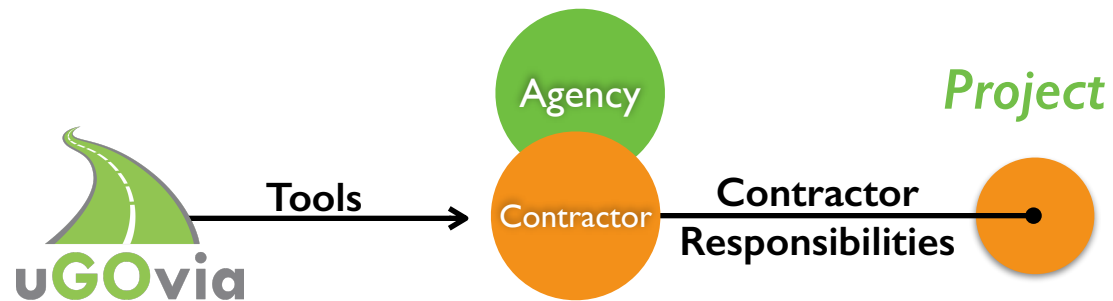
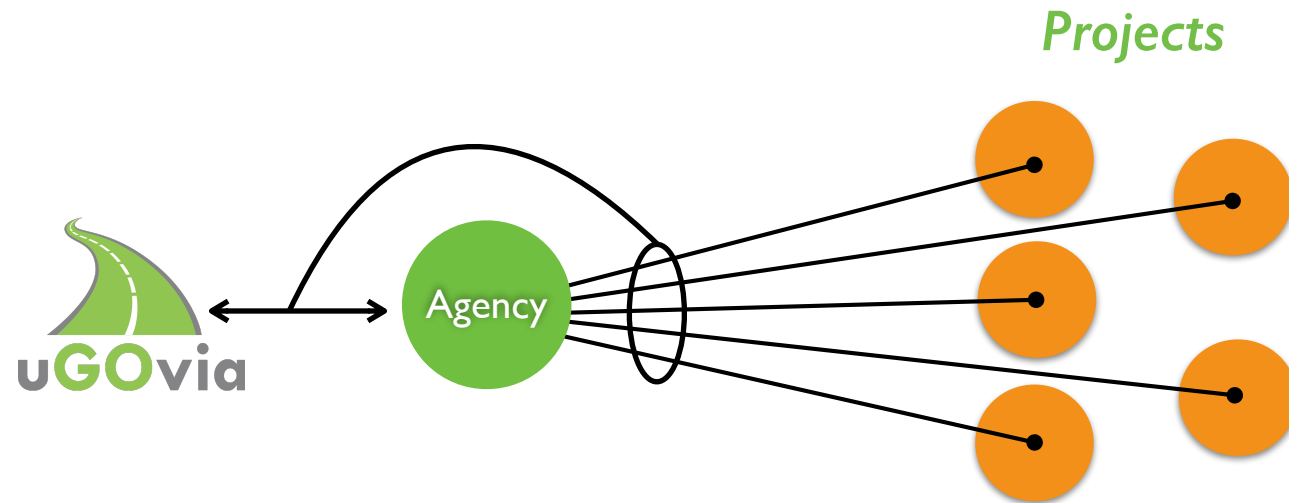
Project-in-progress - Intelligent Work Zone flexibility

Engages internal and external stakeholders

Extends “Public Service Announcement” audience

Promotes pre-trip planning

# Service



# Questions

Contact: Eric A. Johnson  
[eric.johnson@ugovia.com](mailto:eric.johnson@ugovia.com)  
651-335-5795